s18: EXP LOG (SLTN v345)
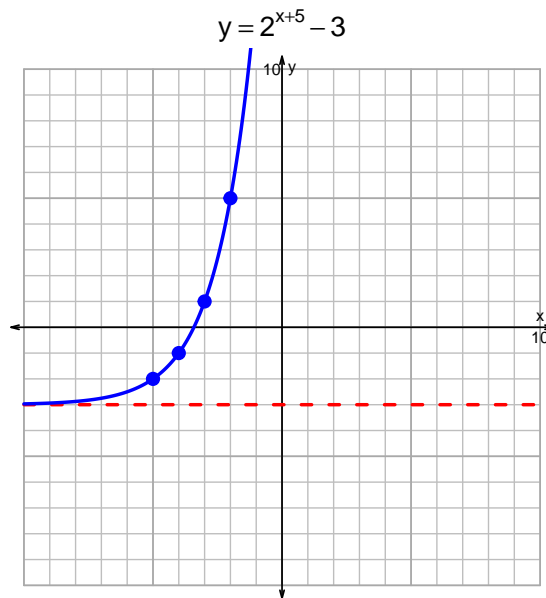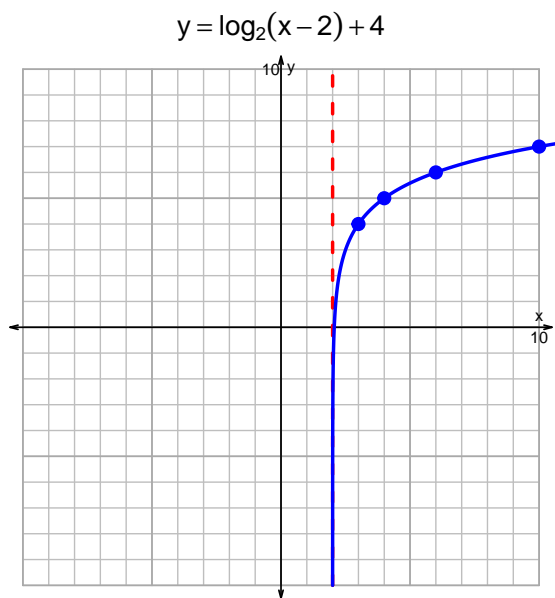
1. (10 pts) Graph $y = \log_2(x - 2) + 4$ and $y = 2^{x+5} - 3$ on the grids below. Also, draw any asymptotes with dashed lines.

$$y = \log_2(x - 2) + 4$$

$$y = 2^{x+5} - 3$$

Somewhat useful hint: $2^3 = 8$, and thus $\log_2(8) = 3$.

2. (10 pts) Write (but do not evaluate) the solution to the equation below by writing a logarithmic expression. Please do not do any arithmetic; just move numbers around.

$$23 = \left(\frac{4}{3}\right) \cdot 2^{-7t/5}$$

Divide both sides by $\frac{4}{3}$.

$$\frac{23 \cdot 3}{4} = 2^{-7t/5}$$

Take log, base 2, of both sides.

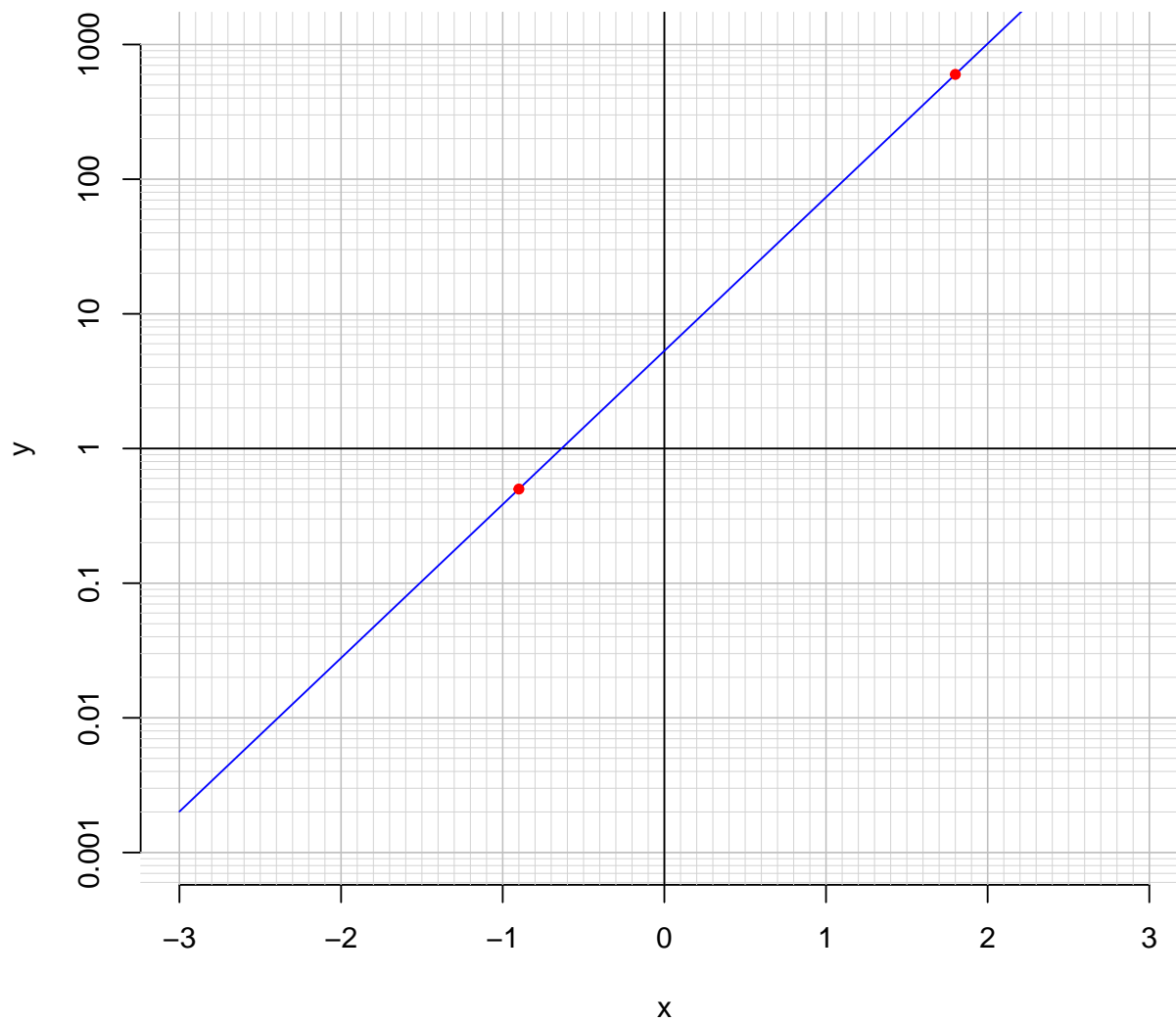$$\log_2\left(\frac{23 \cdot 3}{4}\right) = \frac{-7t}{5}$$

Divide both sides by $\frac{-7}{5}$.

$$\frac{-5}{7} \cdot \log_2\left(\frac{23 \cdot 3}{4}\right) = t$$

Switch sides.

$$t = \frac{-5}{7} \cdot \log_2\left(\frac{23 \cdot 3}{4}\right)$$

3. (10 pts) An exponential function $f(x) = 5.31 \cdot e^{2.63x}$ is graphed below on a semi-log plot.

a. Using the plot above, evaluate $f(-0.9)$.

$$f(-0.9) = 0.5$$

b. The inverse function is logarithmic.

$$f^{-1}(x) = \frac{1}{2.63} \cdot \ln\left(\frac{x}{5.31}\right)$$

Using the plot above, evaluate $f^{-1}(600)$.

$$f^{-1}(600) = 1.8$$